HERNIA OF THE VERMIFORM APPENDIX.

WITH AN ACCOUNT OF FOUR CASES.

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WHILE not a rare condition, hernia of the appendix is perhaps sufficiently uncommon to render of interest an account of four cases which have come under the writer's notice. Various theories have been put forward to account for the occurrence of the condition. Thus Lockwood mentions that the gubernaculum testis is sometimes attached above to the cæcum and vermiform appendix, and it is reasonable to suppose that such an attachment would tend to produce an inguinal hernia of the appendix. Probably also in these cases the mesocæcum has been unduly lax, while a mesocolon may also have existed, thereby giving the large bowel a much greater range of movement than it normally possesses. In all of the cases to be reported the patients were of the male sex, and in three of these the condition was certainly present at or soon after birth, while in the fourth case the early history is quite indefinite. In all, likewise, the hernia was of the right inguinal variety. It is further interesting to note that the appendix presented a more or less abnormal condition in all of the cases, and that some argue that suppurative processes are particularly prone to occur in the appendix when in the scrotum, because the stagnation of its contents when so placed gives rise to a lowered vitality of its walls, and because of interference with its circulation due to the position, possible tightness of the rings, or the use of a truss. While this is probably true to an extent, there are others who think that the presence of the appendix in a hernial sac is due to its having previously been affected by appendicitis, and to its having contracted adhesions during the process.

The appendix may either descend alone into the scrotum,

or it may simply accompany the cæcum. Where the appendix is present alone in the scrotum, it may give rise to a characteristic condition. Examination at the neck of the scrotum reveals either the presence of what appears to be a thickened cord, or even a double cord; while the extremity of the appendix lying curled up above the upper extremity of the testicle, together with its thickened mesentery, may simulate a second testicle. A much thickened and fat-laden condition of the mesentery of the appendix, when present in hernia, is said to be characteristic, and it certainly was marked in two of the cases to be recorded. A marked thickening of the sac wall opposite the lower extremity of the appendix was met with in two of the cases and may have been due either to an encysted type of infantile hernia with fusion of the two layers of sac, or to inflammatory thickening.

Case I.—The first case to be recorded, that of a male child, six months old, is typical of a hernia of the cæcum rather than of the appendix alone. The swelling was first noticed by the mother a few weeks after birth, when it was about the size of a marble and was reducible. Two months prior to admission, however, the swelling began to increase in size, and was only reduced with difficulty, while the child became very cross and irritable. A truss was tried, but failed to improve matters.

The child having been admitted to the Elder Hospital under my care, an operation as for the radical cure of hernia was commenced, and the hernia found to be of the congenital type, with a large sac. On opening the sac a considerable mass of bowel presented, which on inspection was found to consist of the lower end of the ileum, ileocæcal valve, and cæcum. The appendix, which was also present, was abnormally long for a child, fully four inches in length, and was lying lengthwise along the cæcum, to which it was rather closely bound by adhesions. One or two small tubercular nodules were present in its mesentery, and the mesenteric glands were markedly enlarged. In this case there was no adhesion between appendix and testicle, although no sac wall intervened between them, the tip of the appendix being turned upwards toward the abdomen and away from the testicle. If therefore the gubernaculum acted in this case in producing the hernia, it must have acted on the cæcum and not on the appendix.

The appendix was freed from adhesions and removed, the stump being umbilicated by a purse-string suture; and then the radical cure of the hernia by Macewen's method was proceeded with. Patient made an uninterrupted recovery.

CASE II.—The second case was that of a boy, three years of age, who was admitted under my care to the Elder Hospital, Govan. Here the history definitely states that a swelling was present in the right scrotum at the time of birth, which the doctor advised should be operated on when the child grew older. While the swelling possibly decreased in size while the child was in bed, it was never entirely reducible. Six months prior to admission, the child became unwell, was irritable, and complained of pain over the swelling, which began to increase in size, and a further increase took place shortly before admission.

On examination after admission the right side of scrotum was found very considerably distended. At the bottom the testicle was plainly distinguishable, while above it, and apparently connected with it, was a large spherical mass, about the size of a walnut, which did not yield an impulse on coughing, and which was thought possibly to be an encysted hydrocele of the cord, prior to applying the light test. Still further up, and extending into the abdomen, was a swelling which masked the cord and yielded a slight impulse on coughing.

As the mass was large and not entirely reducible, the "hydrocele" part remaining in the scrotum, and as the history stated that the mass was increasing in size, operation was determined upon.

An incision as for the radical cure of hernia was made, the sac exposed in the upper part of the scrotum and opened, and the contents examined. It was immediately noticed that the peritoneal sac wall was thickly studded with minute tubercles, while the contained mass consisted of matted tissue, covered with granulations which oozed blood very freely when touched, and which rendered the parts unrecognizable at first. After separation of numerous adhesions, however, it was found that the mass consisted of a loop of intestine. This was pulled more thoroughly down from the abdomen, and the fresh portion so exposed was also found covered with thick shaggy masses of tubercular granulations. Only after very careful examination was it determined that the portion of bowel exposed consisted of the lower end of the ileum and caput cæci, so altered were the parts in appearance

by the granulation masses growing from their walls. Attention was now directed to the "hydrocele" portion of the swelling, which was found to be directly continuous with the upper portion just described, and which possessed a much thicker sac wall than the rest of the hernia. This thickened sac, however, was directly continuous with the upper and thinner ordinary peritoneal sac. The contained mass was found after considerable careful dissection to consist of the appendix, much thickened and inflamed, but not attached to the testicle. The appendix was removed in the ordinary manner after it had been freed of its adhesions, the bowel after similar treatment was returned to the abdomen, and then the radical cure of the hernia by Macewen's method was performed.

The patient made an uninterrupted recovery and was dismissed well.

In this case the thickened sac wall was probably due to the hernia being of the infantile encysted type, the inner evaginated septum having fused with the outer sac wall proper. This thickened wall separated the appendix from the testicle, and it is difficult therefore in this case to see how the gubernaculum could have acted in producing the hernia of the appendix.

CASE III.—The third case was that of a man aged twenty-five, who was admitted to the Elder Hospital under my care, complaining of a swelling in the right scrotum which he first noticed a few days previously, his attention having been directed to the part by a sensation of something slowly giving way when he was lifting a heavy weight. On examination a firm rounded swelling about the size of a walnut was found situated just above the testicle and apparently connected with it. As in the last case this swelling was found to be opaque to transmitted light, hydrocele of the cord thereby being eliminated, and it was not markedly tender to pressure. The vas could not be satisfactorily isolated, as a thick cord ran up from the mass just described into the abdomen through the inguinal canal. There was no impulse on coughing either over the rounded mass just above the testicle or in the thick cord-like structure. A large and rather prominent scar over the inguinal region and upper portion of the scrotum attracted attention, and patient explained that this was left by an operation for rupture which he underwent in infancy. As the present condition was causing patient trouble and unfitting him for work, operation was decided on.

The parts were exposed by an incision as for radical cure of hernia and a small mass of matted omentum found, no sac wall being apparently present. On opening out this mass the appendix was found within it. The appendix extended from the internal ring to the testicle; it was curled on itself toward the tip and was firmly adherent at this part to the upper portion of the testicle. The adhesion to the testicle was dense and avascular, was obviously of long standing, and necessitated cutting to effect a separation. The mesentery of the appendix was thick and loaded with fat. The appendix having been freed from the adhesion to the testicle and from some lesser ones to the inguinal canal, the lower end of the cæcum was brought down by employing gentle traction and using the finger as a hook. The appendix was then removed as in the other cases and the bowel returned to the abdomen, after which the radical cure was performed by Macewen's method. Patient made an uninterrupted recovery and resumed work two months after leaving hospital.

In this case it was thought probable that the appendix had long occupied the inguinal canal, unknown to patient. The attachment to the testicle might be due either to inflammatory mischief or to the gubernaculum. The absence of sac might be due to the previous operation or to suppuration (see below), but the presence of the adhesion between appendix and testicle would suggest that it had been of the congenital type. The sensation of something giving way which the patient described on admission was probably due to the slipping down of the small omental mass which was found enveloping the appendix.

Reference to the journals of the institution in which patient was operated on when an infant some twenty-three years previously showed that he was twenty months old at the time of the operation. A swelling in the groin was noticed from the time he was ten months old, and a truss was worn until the week of admission to the hospital, when it was discarded, as the swelling became red and painful and descended into the scrotum. It increased in size until, on admission, it was pear-shaped, extending above to the inguinal canal, while the lower portion in the scrotum was hot, red, and tender. There was impulse on coughing, but taxis was not successful. On laying the tunica vaginalis open, pus flowed out, after which the bowel was returned with a slip and gurgle, and the pillars of the ring were brought together

by a silver stitch which was removed later. Free drainage was provided and frequent lavage was performed.

From the description given in these old notes it would appear that the patient had a hernia of the appendix from a very early age, and that, when twenty months old, he had an attack of suppurative appendicitis with abscess formation in the tunica vaginalis. Probably in opening the abscess and returning the bowel to the abdomen, the appendix was overlooked, and was left to drain through the open wound, until it gradually healed up. If this surmise be correct, we have here an example of mural implantation of the appendix, probably the first on record, and it must be admitted that, so far as the appendix was concerned, the result was thoroughly satisfactory.

CASE IV.—The fourth case, that of a man aged sixty-two, was not operated on by me, but was sent into the Glasgow University Surgical Clinic as a case of strangulated hernia. Sir William Macewen, whom I assisted at the operation, kindly permitted me to report the case. Patient's history was unsatisfactory. He stated that he strained himself severely twelve years previously when lifting a sack, and that a swelling then appeared in the right inguinal region. This swelling was small but so painful as to necessitate his taking to bed. Notwithstanding the rest in bed it increased in size until a week after the onset, when it became red and tender, after which it gradually subsided. He then wore a truss, which enabled him to perform his work in comparative comfort until two weeks prior to admission. He then began to suffer considerable discomfort, which he at first attributed to the truss, but which increased in spite of rest in bed until distinct pain was experienced. Three days prior to admission he took a dose of salts which acted very thoroughly, but, as the pain still increased, he sought admission to the hospital.

On examination patient's general condition was found very unsatisfactory, both cardiac and respiratory systems being defective, while he looked much older than his age. The right inguinal region and scrotum were occupied by a large pyriform swelling which was firm in consistence and dull to percussion, while the scrotal tissue was much inflamed. The testicle appeared to be fused with the mass, but the swelling and tenderness were too great to permit accurate palpation of the parts. Although movable, the swelling was, fortunately, not reducible. Pulse and temperature were normal.

On incising over the part, the mass was exposed and found to consist externally of a thick layer of matted, omental-like tissue, which was much congested, and presented a dark purple, mottled appearance. It was adherent below to the testicle, which, like the mass, was much inflamed. This mass was next opened, when it was found to be a sac, containing a second sac within it. This second sac was of globular shape, and composed of thick, dense, fibrous tissue, which, when traced upwards toward the inguinal canal, was seen to be continuous above with the normal peritoneum. There was a slight constriction at the line of junction between thickened sac and normal peritoneum. The inner sac, having been freed from adhesions, was then opened, and was found to contain the thickened and inflamed appendix. Here, as in the previous case, the mesentery of the appendix was hypertrophied and laden with fat. The appendix not coming readily out of the sac, and something hard, like a piece of wire, being felt inside, the sac was incised along its anterior surface to the base and opened up. It was now found that the appendix was held in position by a pin, the point and half the shaft projecting through a small ulcerated aperture in the wall of the appendix. The pin was directed upwards and was engaged at the point in the thick fibrous sac, which was also slightly ulcerated at the point of penetration. The point of the pin having been disengaged from the sac, the appendix was freed from some slight adhesions and lifted out. On applying slight traction the colon was now brought down into view, and the appendix was then removed in the ordinary manner. As the colon and all the surrounding tissues were markedly inflamed it was decided not to proceed with the radical cure of the hernia. The bowel was returned to the abdomen and both inner and outer sacs were removed, after which the wound was stitched up. The patient made an uninterrupted recovery.

With regard to the variety of hernia which was present in this case, the presence of the double sac suggests the probability of its being an infantile encysted type. Careful endeavor was made to ascertain how long the pin had been in the intestinal canal, but without success. As the surface was but little corroded, it probably had not been long in the intestine. It would appear probable that its entrance into the appendix two weeks prior to admission caused the increasing discomfort of which the patient complained.

As in the last case, the abnormal position of the appendix undoubtedly tended to protect the patient, as, had such a perforation occurred in the free peritoneal cavity, there can be little doubt but that peritonitis would have been set up. This case also may therefore be said to afford an argument in favor of mural implantation of the appendix, although, of course, it is open to question how far the abnormal position of the appendix in each of these cases contributed to the pathological condition.

So far as I can ascertain, only a comparatively small number of cases of perforation of the appendix by foreign bodies while in the scrotum have been reported. Symonds reports in the *Transactions of the Clinical Society of London* (vol. xxxii) the case of a female aged eighteen, who had a swelling of three years' standing, which began to give trouble a week prior to admission to hospital. The swelling resembled an inflamed gland, but on operation was found to consist of the appendix perforated by a pin. Roberts of Louisville reports a case of perforation of the appendix by a pin, but I have been unable to get details of the case. Hutchinson in the *British Medical Journal* of 1899 mentions a case of perforation of the appendix by a hard spicule, and Broughton and Hewetson report a case of femoral hernia of the appendix, with suppurative appendicitis due to a pin, in the *Lancet* of 1906.

Of course foreign bodies such as pins and needles are not infrequently met with in the appendix while in its normal position, which may cause perforation and give rise to peritonitis; and the occurrence of such cases, together with the great frequency of ordinary suppurative appendicitis when the appendix is in its normal position, would seem, to an extent at least, to negative the supposition that the appendix when fixed in the scrotum is thereby much more prone to pathological changes than when normally situated.

Not merely has the appendix been found in right inguinal and in right femoral herniæ, it has even been found in left-sided herniæ. Possibly developmental peculiarities may again account for the latter form, the large intestine occupying the left side of the abdomen during a period of fetal life.